

ABSTRACT

A charge particle optical column capable of being used in a high throughput, multi-column, multi-beam electron beam lithography system is disclosed herein. The column has the following properties: purely electrostatic components; small column footprint (20 mm square); multiple, individually focused charge particle beams; telecentric scanning of all beams simultaneously on a wafer for increased depth of field; and conjugate blanking of the charged particle beams for reduced beam blur. An electron gun is disclosed that uses microfabricated field emission sources and a microfabricated aperture-deflector assembly. The aperture-deflector assembly acts as a perfect lens in focusing, steering and blanking a multiplicity of electron beams through the back focal plane of an immersion lens located at the bottom of the column. Beam blanking can be performed using a gating signal to decrease beam blur during writing on the wafer.